Improving Army Test and Evaluation: A Team Sport

by

Mr. Michael J. Karwatka
Department of the Army Civilian

United States Army War College
Class of 2013

REPORT DOCUMENTATION PAGE

1. REPORT DATE *(DD-MM-YYYY)* xx-03-2013	2. REPORT TYPE STRATEGY RESEARCH PROJECT		3. DATES COVERED *(From - To)*
4. TITLE AND SUBTITLE Improving Army Test and Evaluation: A Team Sport			5a. CONTRACT NUMBER
			5b. GRANT NUMBER
			5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S) Mr. Michael J. Karwatka Department of the Army Civilian			5d. PROJECT NUMBER
			5e. TASK NUMBER
			5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Professor Louis G. Yuengert Department of Command, Leadership, and Management			8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Army War College 122 Forbes Avenue Carlisle, PA 17013			10. SPONSOR/MONITOR'S ACRONYM(S)
			11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT
Distribution A: Approved for Public Release. Distribution is Unlimited.

13. SUPPLEMENTARY NOTES
Word Count: 5,837

14. ABSTRACT
This paper focuses on improvement of test and evaluation (T&E), and identifies: the high levels of oversight with regard to T&E, the key players in the acquisition process and their required interactions, the purpose of testing and recent reforms in testing. Seven recommendations are provided to improve test and evaluation, including: allow for greater access to and use of contractor test data, establish adequate testing to confirm requirements, increase accountability among stakeholders, consolidate reviews and eliminate redundancy, improve the requirements process, support risk based testing, and include the T&E community in configuration steering boards.

15. SUBJECT TERMS
Oversight, Contractor Testing, Requirements, Redundancy, Risk Based Testing, Configuration Sting Boards

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT UU	b. ABSTRACT UU	c. THIS PAGE UU	UU	34	19b. TELEPHONE NUMBER *(Include area code)*

USAWC STRATEGY RESEARCH PROJECT

Improving Army Test and Evaluation: A Team Sport

by

Mr. Michael J. Karwatka
Department of the Army Civilian

Professor Louis G. Yuengert
Department of Command, Leadership, and Management
Project Adviser

U.S. Army War College
CARLISLE BARRACKS, PENNSYLVANIA 17013

Abstract

Title:	Improving Army Test and Evaluation: A Team Sport
Report Date:	March 2013
Page Count:	34
Word Count:	5,837
Key Terms:	Oversight, Contractor Testing, Requirements, Redundancy, Risk Based Testing, Configuration Sting Boards
Classification:	Unclassified

This paper focuses on improvement of test and evaluation (T&E), and identifies: the high levels of oversight with regard to T&E, the key players in the acquisition process and their required interactions, the purpose of testing and recent reforms in testing. Seven recommendations are provided to improve test and evaluation, including: allow for greater access to and use of contractor test data, establish adequate testing to confirm requirements, increase accountability among stakeholders, consolidate reviews and eliminate redundancy, improve the requirements process, support risk based testing, and include the T&E community in configuration steering boards.

Improving Army Test and Evaluation: A Team Sport

> Institutional change is not merely about pinching pennies or pushing pens. And efficiencies are not simply about improving the bottom line. They're about doing things better, doing them smarter, and taking full advantage of the progress, technology, knowledge, and experience that we have available to us.
>
> —The Honorable John McHugh[1]
> Secretary of the Army

The defense acquisition system is complex, and it poses unique challenges to the Department of Defense in its effort to develop and field new capabilities. The Army has struggled to determine its modernization priorities since the cancellation of the Future Combat System in 2009. Acquisition challenges coupled with undefined priorities have resulted in the cancellation of several Major Defense Acquisition Programs (MDAP). As a result, Department of Defense leaders are losing faith in the acquisition system's ability to successfully deliver capabilities. From 1990 to 2010, the Army terminated twenty-two MDAPs before completion, with 15 having been terminated since 2001. This represents approximately a quarter of the Army's allocated research, development, test and evaluation money for this time period spent on failed programs.[2]

As a result of these problems, Army leadership, the Office of the Secretary of Defense (OSD), Congress and industry have lost trust in the Army's acquisition processes and capability to effectively provide Warfighters the equipment and services they require in a timely manner. Despite these struggles, the U.S. Army is still regarded as the best equipped and most technologically advanced army in the world. This can be attributed in part to overseas contingency operations funding and rapid acquisition processes employed during the last ten years which have delivered cutting edge

technologies to the battlefield. In light of the impending fiscal uncertainty and defense budget reductions, supplemental funding will soon come to a halt. As a result, the acquisition community must find more timely and efficient means to provide Warfighters the capabilities needed to remain the best equipped Army in the world.[3]

The current uncertain fiscal environment facing the Nation forces the Army to revisit its approach to developing, acquiring and sustaining new acquisition systems. This approach must result in the delivery of effective and reliable systems, but it must also be flexible and adaptive in its application such that timely decisions are made based on demonstrated performance and reasonable risk. This paper will analyze how the Army's test and evaluation efforts support the larger acquisition process, and it will identify areas of improvement to speed delivery of solutions to the Warfighter more efficiently and economically without compromising quality or accepting undue risk.

Background

The purpose of Army acquisition is to equip and sustain the Army so that it meets current and future mission requirements. The manner in which the Army does this is complex and is guided by 20 different statutes, 2,000 pages of regulations and other various policies.[4] The law requires materiel systems be procured through a three step process: 1) identifying the capability required, 2) establishing a budget to support the effort and 3) acquiring the system in accordance with the laws and guidelines of the Defense Acquisition System.[5] Successful implementation and execution requires that these processes be aligned.

Requirements are identified by the Joint Staff, the Services, and the Combatant Commanders through a process known as the Joint Capabilities Integration and Development System (JCIDS). JCIDS assesses gaps in military capabilities and

recommends solutions to fill the gaps. It plays a key role in identifying the capabilities required by the Warfighters to support the National Security Strategy, the National Defense Strategy and the National Military Strategy. The primary objective of the JCIDS process is to ensure that capabilities required by joint Warfighters to successfully execute the missions assigned to them are identified. The JCIDS process also identifies the operational performance criteria of capabilities required by the Joint Force.[6] The requirements process supports the acquisition process by providing validated capability needs and associated performance criteria to be used as a basis for acquiring the right systems.[7] For materiel solutions, JCIDS produces the Initial Capabilities Document, Capability Development Document (CDD), and the Capabilities Production Document (CPD). The CDD and CPD are system specific and support development and evaluation by documenting the technical requirements the system is expected to meet. The Vice Chairman, Joint Chiefs of Staff is the chairman of the Joint Requirements Oversight Council (JROC) that oversees the JCIDS and supervises the preparation of the Chairman's Program Recommendation, which provides recommendations to OSD for inclusion in the Defense Planning and Programming Guidance. The Vice Chief of Staff of the Army is the Army representative on the JROC.[8]

The budget is established through the Planning, Programming, Budgeting and Execution System (PPBE). The purpose of the PPBE process is to allocate resources within the Department of Defense. The process is a combination of four distinct sections: Planning, Programming, Budgeting, and Execution. PPBE is linked to the Defense Acquisition System by the financial resources it provides to acquisition programs. Upon initiation, an acquisition program identifies its resource requirements

over the life of the program. These requirements must be consistent with the resources that have been allocated by the PPBE process. As the program proceeds through the acquisition process, its budget requirements are updated. Any changes to budget requirements must be addressed through the PPBE process. Decisions that alter the program's budget request, whether through additional funding or funding cuts, have an effect on the program's execution. For instance, budget cuts could reduce the scope of a program; extend its schedule or both.[9]

The Defense Acquisition System is the process used to develop and purchase the desired system. The two guiding documents that outline this process are DoD Directive 5000.01 and 5000.02. DoD Directive 5000.01, The Defense Acquisition System, provides the policies and principles that govern the Defense Acquisition System.[10] DoD Instruction 5000.02, Operation of the Defense Acquisition System, establishes the management framework that implements these policies and principles.[11] The Defense Acquisition System is an event-based process where programs advance through several decision points and milestone reviews until ultimately being fielded to the Services.

<div align="center">Primary Participants in Defense Acquisition</div>

The major participants in the acquisition process are Congress, the Office of Management and Budget, the OSD, the Joint Staff, the Office of the Service Secretary, the Service Acquisition Executive, the military service materiel commands, program management offices (PMO), industry and functional support organizations. Army Training and Doctrine Command (TRADOC) and the Army Test and Evaluation Command (ATEC) are the two primary functional support organizations for Army

acquisition. Each participant in the acquisition process exercises responsibilities to ensure that laws and regulations are observed and programs pursued efficiently.

This paper focuses on improvement of test and evaluation by identifying: the high levels of oversight with regard to T&E, the key players in the acquisition process and their required interactions, the purpose of testing and recent reforms in testing. The recommendations at the end of this discussion will improve test and evaluation when implemented.

OSD, through the Director, Operational Test and Evaluation (DOT&E) provides operational evaluation reports to Congress. The primary purpose of DOT&E is to describe the operational effectiveness and suitability of a system being tested within the operational combat environment.[12] DOT&E was created in part because of the findings of a Blue Ribbon Panel Report in 1970 which cited problems with operational testing and evaluation. The report noted that each Service had a different system for operational testing that neither OSD nor the Joint Chiefs had much control over. Eventually established by Congress in 1983, DOT&E was tasked with providing test and evaluation oversight in order to help coordinate Service testing policies and to ensure that the Services devoted adequate resources to this area.[13] The Weapon Systems Acquisition Reform Act of 2009 established The Office of the Deputy Assistant Secretary of Defense, Developmental Test and Evaluation (DT&E) within the Office of the Assistant Secretary of Defense, Research and Engineering. DT&E is responsible for evaluating developmental test capability within the Department of Defense. The creation of this agency highlights the importance DoD places on developmental testing in its

relation to systems acquisition. DT&E is designed to be a collaborative partner with DOT&E to ensure acquisition decisions are supported with the right T&E information.[14]

The role of the PMO is to direct the development, production, and fielding of a new defense system. This must be done within the limits of cost, schedule, and performance, as approved by the program manager's acquisition executive. The program manager's role is to be the Army's agent to ensure the Warfighter's modernization requirements are met efficiently and effectively in the shortest possible time.[15]

TRADOC, through TRADOC Capability Managers (TCMs), represents the Warfighter by serving as the advocate for the end-user. TCMs are responsible for systems that provide a particular capability or function for the Army. The TCMs provide organizational subject matter expertise for their assigned capability area and are responsible for the technical and functional requirements of the materiel systems. Furthermore, TCMs provide for the integration of all doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) for the capability area.[16]

ATEC serves as the independent evaluator of Army systems. The Army Evaluation Center performs evaluation planning and uses the test resources, including ATEC's developmental test ranges as well as the Operational Test Command, to carry out detailed evaluations that encompass system Effectiveness, Suitability, and Survivability in an operational context. ATEC's primary purpose is to provide independent information to decision makers to aid in acquisition decisions.[17]

Although each organization has different missions, they all work together toward a common end - the delivery of effective, suitable and survivable systems. The following sections of this paper will focus on the interactions between OSD, PMOs, TCMs and ATEC representatives as they work towards fielding new equipment.

Introduction to Testing

"The primary purpose of test and evaluation (T&E) is to support system development and acquisition by serving as a feedback mechanism in the iterative systems engineering process."[18] ATEC's mission is to provide information to acquisition decision makers. Through testing, the T&E community determines if a system meets its specified requirements to ascertain whether it provides the military capability being sought. A variety of testing is planned and performed, from early contractor tests through rigorous operational tests, all designed to evaluate the progress of the program. It is through testing that the Army validates the performance against the requirements identified during the JCIDS as outlined in the requirements documents (CDD or CPD). These documents outline the threshold and objective requirements of a particular system as well as the Key Performance Parameters (KPPs). The threshold requirement denotes the minimum acceptable requirements and the objective denotes the desired requirements. The KPP is the capability or characteristic that is so significant that failure to meet the threshold can be cause for the concept or system selection to be reevaluated or the program to be reassessed or terminated.

The Army evaluates system performance through the data derived from three primary types of tests: contractor, developmental and operational. Contractor tests are performed to determine design and development maturity in order to decrease the technological risks prior to initiating formal government testing. It is common for

contractor tests to be performed at government test ranges or facilities since most contractors do not have facilities adequate to perform the necessary tests. Performing these tests at government facilities provides a greater opportunity for government evaluators to witness the tests, thereby affording the evaluators greater confidence in the test protocols as well as trust in the authenticity of the results. In some cases, this trust and confidence in contractor test data allows government evaluators to use this data in lieu of repeating the tests later during developmental testing.

Developmental tests (DTs) encompass a wide range of technical and safety testing. DT is intended to measure the technical performance of a system. The PMO and the contractor use DT to demonstrate that the technical risk areas identified during contractor testing can be reduced to acceptable levels. With the exception of DT safety tests, developmental tests are largely discretionary and are primarily used by the PMO and contractor to identify deficiencies and confirm fixes prior to more strenuous operational tests. Specific safety testing is required by law to verify system safety with a high degree of confidence. Safety documentation must be provided by ATEC prior to any hands on use, training, testing or maintenance by Soldiers.

After a system meets its technical requirements, Operational Testing (OT) is used to assess the Soldier and system interface and the ability of a Soldier or unit, equipped with a system, to complete their intended mission. OT provides data in support of answers to these questions:

- Will the system work in an operational environment?
- Can the Soldiers use the system as it is intended?
- How will Soldiers address system failures or employ work-arounds?

- Does the system represent a net improvement to operational capability?

- Does use of the system introduce other issues or problems affecting Mission capabilities?[19]

Over the last few years the test community began, where feasible, integrating DT and OT into a combined test event which saves time and money. Integrated testing's goal is to conduct a seamless test program that produces credible data useful to evaluators, and address developmental, sustainment, and operational issues. Integrated testing allows for the collaborative planning of test events; where a single test point or mission can provide data to satisfy multiple objectives, without compromising the test objectives of participating test organizations.

Acquisition Culture

For decades leaders have attempted to institutionalize change within the acquisition process. Some initiatives have been popular, widely accepted and effective, while others have had less effective results. Despite the fact that most acquisition professionals agree that change is necessary, it is human nature to resist change. As Secretary Gates indicated "the culture of any large organization takes a long time to change. The really tough part is preserving those elements of the culture that strengthen the institution and motivate the people in it, while shedding those elements of the culture that are barriers to progress and achieving the mission."[20] The 2010 Army Acquisition Review chartered by Secretary McHugh found that "the Army acquisition culture has increasingly become risk averse, placing more attention on not repeating mistakes than on identifying and managing risk for the best outcome."[21]

Unique cultural characteristics exist among acquisition professionals. First and foremost, the acquisition community generally shares an overall attitude of optimism. Optimistic characteristics are evident in such things as the schedules developed, assumptions made, approaches to working through problems encountered and forecasts of system performance. Whether responding to inquiries from Congress, the press or the public, most acquisition professionals downplay the significance of performance setbacks, cost overruns and schedule changes.[22] Optimism can be a double edged sword in this environment. On one hand, optimistic forecasts and projections enable acquisition personnel to more readily secure financial resources by way of the PPBE process. On the other hand, when projections fall short they can serve to discredit acquisition personnel in the eyes of Congress and other senior decision makers. Additionally, the acquisition culture is overly bureaucratic; a by-product in large part created by a lack of trust and a result of previous reforms that created additional checks, balances and oversight. Needless to say, layers of bureaucracy often impose redundancy and can lead to delays.

Organizational cultures are created in part by leaders, and one of the most decisive functions of leadership is the creation, management, and sometimes even destruction of cultures.[23] In *Leading Change*, John Kotter indicates that organizational change can stall because of "inwardly focused cultures, paralyzing bureaucracy, a low level of trust, lack of teamwork, arrogant attitudes, a lack of leadership, and the general fear of the unknown."[24] Major General (MG) Genaro Dellarocco overcame those obstacles and led ATEC through a period of broad organizational change. MG Dellarocco's arrival and assumption of command at ATEC marked a turning point in a

cultural transformation in the command. Together with Brian Simmons, the command's Technical Director, change was embraced. Testers and evaluators alike were encouraged to seek more efficient practices whether inside the headquarters or out on the test ranges. The leadership fostered creative approaches which fundamentally changed the way ATEC provided test and evaluation support. The support by the leadership enabled the test community in collaboration with PMOs to develop innovative solutions that saved time and money.

<div align="center">Recent T&E Transformation</div>

Throughout the years there have been extensive reviews and studies aimed at improving the acquisition system. These reviews and studies, which resulted in only minor improvements, have not eliminated the overall critique of the system that it is too time consuming, too costly and unable to deliver products that meet the technical parameters required. The challenge in transforming Army acquisition lays primarily in that MDAPs are extremely technologically advanced and complex. These programs are often designed to achieve performance levels never before realized. The laws of physics are often pushed to the limit with the application and use of materials that have never before been used in military applications, creating an environment of risk and uncertainty. Despite these technical challenges, there have been continual attempts to heed the call from Secretary McHugh to transform Army acquisition and test and evaluation in order to better deliver capabilities to the Warfighter. Many of these attempts have resulted in improvements; however, some transformative measures have resulted in unintentional delays and burdens to the process. For example, WSARA 2009s creation of DT&E provided OSD more oversight of DT activities.[25] Reform efforts such as WSARA instituted more reviewers in an already complex acquisition process.

More reviews add to the burden of program managers and equip more oversight agencies with veto authority. As a result, rather than streamlining the acquisition process, the process became more complex and time consuming.

The acquisition community has proven that in times of war it can deliver timely capabilities. This is primarily due to the fact that wars enable that community to streamline the acquisition process, allowing them to bypass some of the lengthy procedural delays that hinder traditional programs in peacetime. For instance, to respond to the urgent and rapid demand for systems to support the deployment in Iraq and Afghanistan, ATEC supported rapid acquisition by developing a new reporting process that stressed the identification and documentation of the equipment capabilities and limitations for decision makers and the users prior to fielding to theater. ATEC deployed Forward Operational Assessment teams, on six-month rotations, to Iraq, Kuwait, and Afghanistan to collect information on systems in order to identify and fix shortfalls so that systems could quickly fill the requests from operational commanders.[26] Through capabilities and limitation reports and safety confirmations, ATEC provided information to decision makers to support fielding decisions in a matter of months; far quicker than it takes for traditional acquisition programs.

Despite the ability of rapid acquisition programs to provide responsive capabilities to Warfighters, there are inherent problems and risks associated with this process. For example, rapid acquisition efforts rarely adequately address the DOTMLPF considerations, they often provide solutions to short term problems rather than long term ones, and they often fail to account for the life cycle sustainment plans and

associated costs. As a result, the Army is faced with addressing long term sustainment costs and issues to systems that were fielded only for immediate capabilities.

ATEC used the 2005 Base Realignment and Closure (BRAC) as a means to disestablish a headquarters, consolidate staff functions and reduce overhead. ATEC headquarters moved from Alexandria, VA to Aberdeen Proving Ground (APG), MD as part of the 2005 BRAC. ATEC used this as an opportunity to reorganize by eliminating the Developmental Test Command (DTC) Headquarters, a subordinate command of ATEC, by absorbing the functions of the DTC staff within the ATEC Headquarters staff. Retirements and personnel electing not to BRAC to APG allowed ATEC to maintain stable personnel levels. This reorganization was an example of how ATEC leaders identified opportunities to use resources better, leading to reduction in the cost of doing business.

In April 2009, a Defense Science Board report stated that "fixing the acquisition process is a critical national security issue—requiring the attention of the Secretary of Defense."[27] General (GEN) Peter Chiarelli, Vice Chief of Staff of the Army from 2008 to 2012, took notice and challenged Army developmental and operational testers to continue finding ways to work together to speed up acquisition and test and evaluation processes. GEN Chiarelli brought the test, PMO and TRADOC communities together in 2011 by mandating that the three organizations use semi-annual network evaluations at Fort Bliss, TX as a means to: integrate components of the Army's network, evaluate these components and determine the ability for these components to be fielded.[28]

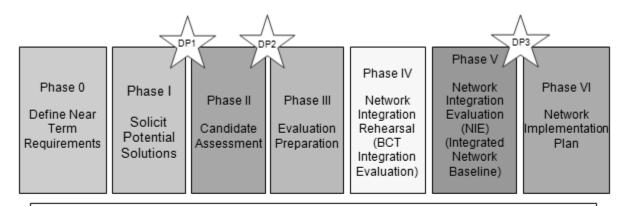The three communities formed a triad consisting of ATEC, the Brigade Modernization Command representing TRADOC, and the Assistant Secretary of the

Army for Acquisition, Logistics and Technology's System of Systems Integration

Directorate representing multiple PMOs. They created a semi-annual evaluation of

technologies referred to as the Network Integrated Evaluation (NIE). The primary

purpose of the NIE is to support acquisition decision reviews (low rate initial production

and full rate production) as well as partner with industry in the test and evaluation

process. The NIEs are part of the Army's newly created Agile Process. The Agile

Process is a streamlined acquisition methodology used to address defined capability

gaps and insert new technologies into the network.[29]

The Agile Process consists of seven phases (Figure 1). The process starts with

the identification of capability gaps, requirements and candidate solutions. This is a

continuous process. The process includes assessment and selection of solutions to be

tested and evaluated and it concludes with an acquisition decision. Industry is

encouraged to participate by submitting solutions on a semi-annual basis that address

capability gaps. Although this process is ideally suited for command, control,

communications, computers and intelligence (C4I) systems that are networked, it serves

as an effective means to test the interoperability of independent systems that access

the network in order to exchange information. The Agile Process supports Capability

Set Management which is a structured approach that allows the Army to buy and field

equipment that units need and then incrementally modernize this equipment over time.

This reduces the problem of expending resources on technology that may be out of date

by the time it is needed. By employing the Agile Process with NIE, the Army leverages

industry advancements and keeps up with the pace of changing technology.[30] The NIEs

also serve as a forcing mechanism to reduce the tendency of program managers to

develop technologies in a stove piped manner. The NIEs provide an environment for the demonstration of system of systems integration. Since most materiel systems link to or rely on other systems to accomplish the intended mission, the NIE encourages materiel developers to account for potential integration and interoperability challenges with other fielded systems.

Figure 1. Agile Process

After the execution of NIE 12.2 in FY2012, ATEC provided reports for the 35 systems under evaluation. Of the 35, 15 had high potential for fielding, 15 had medium potential for fielding and 5 had low potential for fielding.[31] These reports were used to inform decision makers on acquisition decisions for these systems. Conducting NIEs allows ATEC to conduct tests concurrently which results in cost savings and cost avoidance. These efficiencies along with other program restructures have resulted in over $6 billion in savings.[32]

Recommendations to Transform T&E

Chief of Staff of the Army GEN Odierno commented that the greatest threat to our national security is fiscal uncertainty, but this uncertainty presents us with an

opportunity to shape the Army of the future.[33] There is opportunity to improve test and

evaluation. However, this opportunity requires the collective willingness of ATEC,

PMOs, TCMs and OSD to work together under the guidance and parameters set forth

by the Secretary of Defense to improve the acquisition process. As noted previously,

the Army test community has made positive attempts to improve the way it conducts

test and evaluation. However, more can be done with the cooperation of all

stakeholders. Like ATEC, all organizations involved in Army acquisition need to take an

introspective look and challenge their processes and their unique cultural characteristics

that may inhibit making changes. There are no silver bullets that will fix the acquisition

process, but the Army can take actions to improve test and evaluation. These actions

fall into 7 categories:

- Allow for greater access to and use of contractor test data.

- Use adequate testing to confirm requirements.

- Increased accountability among stakeholders.

- Consolidate reviews and eliminate redundancy.

- Improve the requirements process.

- Support risk based testing.

- Include the T&E community in configuration steering boards.

Allow for Greater Access to and Use of Contractor Data

As previously mentioned, in some cases contractor test data can be used by

government evaluators, eliminating the need to repeat the test using government

resources. Even if the data is not sufficient, access to contractor data can serve to

optimize government testing. For example, transportability tests or vulnerability tests

could be optimized if government personnel had access to the contractor

subcomponent and component tests. There is reluctance among contractors to allow

access because government evaluators may use this data for negative reporting.

However, inserting language in the requests for proposal allowing for government

access to contractor test data would lend to an increase in use and ease of obtainment

of data.

<u>Use Adequate Testing to Confirm Requirements</u>

A continuing debate among acquisition professionals deals with the amount of

rigor that should be applied to government testing. In one camp proponents of rigor

argue that research, development, test and evaluation (RDT&E) represents less than

30% of a systems lifecycle costs. They argue that since 70% of a system's costs are

operations and support, from a pure economic perspective, it is better to identify

deficiencies and allow for fixes in the RDT&E phase rather than field unreliable systems

that require much more costly fixes during the sustainment phase. This line of thinking

led the test community to develop "robust" test plans that were effective in identifying

the full capabilities and weaknesses of systems. These test plans were time consuming

and costly and drew the attention of senior decision makers aimed at conducting tests

more efficiently, which then led the test community to develop "adequate" test plans.

However, leaders need to better define what adequate means. From OSD's perspective

"to be adequate, the operational evaluation must report performance across the

operational envelope, not just at single conditions specified in the capabilities

documents."[34] Many believe that this is not a definition of adequacy, but rather a

definition of robust testing which is overly costly and too time consuming.

The test community needs to continue to verify the Soldier's ability to operate systems in their intended environment in accordance with the requirements documents in order to ensure systems are effective, suitable and survivable. To the extent possible, the test community should leverage all available data to include contractor, government DT and previous government OT in cases where the fit, form or function of a system has not been changed from the Soldiers' perspective. Additionally, in some cases the test community has mandated the demonstration of all requirements (both threshold and objective). In cases where DOT&E or DT&E mandate that the Service demonstrate above threshold level capabilities, OSD should pay the extra costs. Requiring the Services to invest in systems that perform above the threshold capability results in mandated requirements from the test community to the Services, which is contradictory to the acquisition process.

Increased Accountability Among Stakeholders

Requirements and proving system safety drives test programs. The testers, both Service and OSD, need to be accountable for all T&E actions imposed on programs. ATEC is responsible for executing adequate testing and for being efficient in the process. PMOs are accountable for all the costs they impose. Similarly, test requirements added by organizations should be identifiable and defendable. This is not currently the process. All additions by OSD to T&E programs now only show on the Service T&E cost line. Testing demands without accompanying accountability and transparency hinder the advancement of a T&E cost culture and fuel the debate about how much testing really costs.[35] DOT&E's role is established in law. However, there seems to be great latitude in the interpretations of the true intent of Congressional legislation vice what DOT&E is enacting. A roles and missions relook is warranted to

determine the cost/benefit to the current method of implementation of the Congressional mandate for OSD oversight agencies.

There is an accusation among many stakeholders that test costs are too high. Providing test budgets to ATEC could resolve this accusation. Currently RDT&E funds are managed by the PMO. Providing RDT&E budget authority to ATEC will allow the test community to determine how it manages resources within constraints. The benefits to this process include: better traceability of test costs, improved cost estimates for future testing based on actual test cost data and improved obligations and expenditures for each program based on a better understanding of test costs.

Consolidate Reviews and Eliminate Redundancy

WSARA 2009 established Developmental Testing (DT) oversight in OSD. This review is in addition to the existing oversight of Operational Testing (OT) and Live Fire efforts. Currently, the DT and OT oversight agencies are different offices within OSD, each with separate and distinct chains of command and reporting procedures. Separate DT and OT approvals add time to an already lengthy process. Separate DT&E and DOTE OSD oversight requirements increase and complicate the staffing timelines and briefings. Getting DOT&E to accept DT data, government and contractor, and getting DT&E to wait until OT for select data is challenging and can lead to redundant testing. Different T&E elements in OSD work in opposition to integrated T&E planning and execution.[36] During Integrated Product Team meetings, program managers can have anywhere from four to six test and evaluation points of contact to take guidance from, two from OSD, one from the Deputy Under Secretary of the Army for Test and Evaluation (DUSA (TE)), and anywhere from one to three within ATEC. This is a by-product of years of acquisition reform that resulted in more layers of oversight and

involvement. OSD should Identify the similarities in missions of organizations such as DOT&E and DT&E, DUSA (TE) and ATEC, and the engineering test agencies located within the Research and Development Command. For example, combine the oversight responsibilities of DOT&E and DT&E so that one representative has oversight of both DT and OT for a system under oversight to streamline the management chain of command and reduce the number of people needed to support program managers. As a result, efficiencies can be gained through streamlined reporting as well as reduced conflicting guidance. Too often program managers must convene meetings with DT&E representatives seeking approval of efforts that have both DT and OT impacts only to convene the same meeting later with DOT&E representatives to discuss the same information. Cost savings and faster results are possible by consolidating organizations, centralizing functions and reducing duplication and redundancy.

Improve the Requirements Process

The Army needs to improve the way it defines requirements and necessary capabilities. Test and evaluation starts with an understanding of system requirements and answering whether a system meets or exceeds requirements. Unconstrained system requirements, requirement and technology creep and a failure of TRADOC personnel to understand their own requirements are pervasive problems. The requirements generation process is primarily handled by TRADOC. System requirements developed during World War II are often found within many of today's requirements documents. Rather than pass operational requirements off to the next generation system, TRADOC, with input from the Combatant Commands, needs to improve the method with which it derives operational requirements. This derivation needs to be supported by data so that any shortfalls or tradespace in the requirements

can be understood by decision makers. Requirements need to be articulated in terms of operational impact so that in situations where a system is not performing as expected the acquisition community can articulate the operational impact to the JROC. The JROC would then be able to determine how much the additional capability is worth or to relax the requirement.

Risk-Based Testing and Decision-Making

The entire acquisition community, testers, PMO and force developers, needs to develop an agile framework that guides decision-making. The DoDI 5000.02 outlines a management system designed to reduce risk to the greatest extent possible so that decision-makers can make the best decisions on materiel acquisitions. However, DoDI 5000.02 should not be the management system that guides all system acquisitions. Many materiel solutions are upgrades to existing systems that are low risk initiatives. These cases should be handled differently than high risk evolutionary ventures. In cases of system upgrades and commercial-off-the-shelf procurement, the test community needs to more readily accept previous test data and accept modeling and simulation data, thereby reducing costs and the acquisition timeline.

Include the T&E Community in Configuration Steering Boards

Configuration Steering Boards (CSB) were instituted as a means to limit requirements changes and avoid cost increases to programs. The attendee list at CSBs are intended to be broad as the board reviews the requirements and configuration changes that have the potential to impact programs. However, the Service test community is rarely invited to participate. The agendas of CSBs typically consist of requirements overview, cost and affordability, schedule review, de-scoping suggestions and management initiatives. There is rarely an opportunity for the Army's independent

test agency to discuss emerging results of the tests performed to date. Providing the test community a seat at the CSB would enable them to provide input on how the de-scoping proposals could impact both the future tests and the evaluation reports, which would be beneficial to the CSB chairperson. There are cases where de-scoping initiatives did not achieve their intended results because they failed to take into consideration other aspects of the systems requirements, such as reliability, which were the primary drivers of the test and evaluation program. Allowing the test community to participate in the full CSB process will provide decision-makers with greater information and insight.

<center>Conclusion</center>

The Army must continue to challenge the processes and procedures it uses to acquire materiel solutions. Reliance on old practices employed in periods of economic prosperity is unaffordable. However, successfully changing processes and procedures requires buy-in and synchronization across multiple echelons of command and across diverse management structures. Although each share a common endstate, the participants in the Defense Acquisition System have unique responsibilities, varying interpretation of risk, differing time horizons, and competing priorities. The system also requires strong leaders who are willing to challenge the status quo, make tough decisions and be accountable for their actions. Senior civilians and officers who develop the momentum to affect change are often followed by those who are influenced by differing priorities.

Program managers, TRADOC capability mangers and T&E personnel have worked through challenges in order to deliver systems that provide the Warfighter the technology edge on the battlefield. These three communities must now work together to

improve their ability to deliver effective, suitable and survivable systems in a timely and

affordable manner.

Endnotes

[1] John McHugh, "Association of the United States Army Keynote Speech," AUSA Annual Meeting and Exposition, Washington DC, October 25, 2010.

[2] Department of the Army, *Army Strong: Equipped, Trained and Ready, Final Report of the 2010 Army Acquisition Review* (Washington, DC: Department of the Army, January 2011), p xx.

[3] Ibid., viii-ix.

[4] Bernard Carreau, "Outsourcing Civilian Capabilities and Capacity" in *Civilian Surge, Key to Complex Operations*, ed. Hans Binnendijk, and Patrick M. Cronin (Fort McNair: National Defense University, 2009), 184.

[5] Moshe Schwartz, *Defense Acquisitions: How DoD Acquires Weapon Systems and Recent Efforts to Reform the Process* (Congressional Research Service, 2013), 3.

[6] Chairman Joint Chiefs of Staff, *Chairman Joint Chief of Staff Instruction 3170.01H: Joint Capabilities Integration and Development System* (Washington, DC: Chairman Joint Chiefs of Staff, January 10, 2012), 1.

[7] *Defense Acquisition Guidebook* (Defense Acquisition University, 2010), 12, https://dag.dau.mil (accessed March 1, 2013).

[8] U.S. Army Force Management School, *Department Of Defense Planning, Programming, Budgeting, And Execution (PPBE) Process/ Army Planning, Programming, Budgeting, And Execution (PPBE) Process —An Executive Primer—* (Fort Belvoir: U.S. Army Force Management School, 21 Oct 2010), 16.

[9] "BCF 103 Business Financial Management," Defense Acquisition University, https://learn.dau.mil/CourseWare/10_3/mod4/au1/m04f0120.html (accessed March 6, 2013).

[10] DoD Directive 5000.01, "The Defense Acquisition System," May 12, 2003.

[11] DoD Instruction 5000.02, "Operation of the Defense Acquisition System," December 8, 2008.

[12] *Report of the Defense Science Board Task Force On Developmental Test and Evaluation* (Washington DC: Office of the Under Secretary of Defense For Acquisition, Technology, and Logistics, 2008), 9.

[13] J. Ronald Fox, *Defense Acquisition Reform, 1960-2009: An Elusive Goal* (Washington DC: Center of Military History, 2011), 64.

[14] "DT&E Program Engagement: Organization," Office of the DASD for Developmental Test and Evaluation, http://www.acq.osd.mil/dte-trmc/dte_program_engagement.html (accessed February 12, 2013).

[15] "Program Manager," Defense Acquisition University, https://dap.dau.mil/acquipedia/Pages/ArticleDetails.aspx?aid=d2bfbb5f-93a7-42fd-8ed4-272d6fd51aa1 (accessed February 12, 2013).

[16] Carl Harris and John Robertson, "From TRADOC System Managers to TRADOC Capability Managers: Creating an Organizational Focus," *Army AT&L*, April - June 2011, 67-69.

[17] Kerry Wyant, *Evaluator and Analyst Handbook* (Aberdeen Proving Ground: Army Evaluation Center, 2007), v.

[18] U.S. Department of the Army, Test and Evaluation in Support of Systems Acquisition, Department of the Army Pamphlet 73-1 (Washington, DC: U.S. Department of the Army, May 30, 2003), 1.

[19] Wyant, *Evaluator and Analyst Handbook*, 2-4.

[20] Robert Gates, "Remarks to Air War College," lecture, U.S. Air War College, Maxwell-Gunter Air Force Base, Montgomery, AL, April 21, 2008.

[21] Department of the Army, *Army Strong: Equipped, Trained and Ready*, 40.

[22] Fox, *Defense Acquisition Reform*, 11.

[23] Edgar H. Schein, *Organizational Culture and Leadership* (San Francisco: Jossey-Bass, 2010), 22.

[24] John P. Kotter, *Leading Change*, (Boston, Harvard Business School Press, 1996), 20.

[25] *Weapon Systems Acquisition Reform Act of 2009*, Public Law 111-23, § 102, Cong. (May 22, 2009), 8.

[26] Ronald Crevecoeur, *Changing Norms: Keeping Army Test and Evaluation Flexible and Adaptable*, Strategy Research Project (Carlisle Barracks, PA: U.S. Army War College, March 30, 2010), 5.

[27] Department of Defense, Creating a DoD Strategic Acquisition Platform, (Washington DC: Department of Defense, April 2009), 1.

[28] AUSA Torchbearer National Security Report, U.S. Army Operational Testing and Evaluation: Laying the Foundation for the Army of 2020 (Arlington, VA: Institute of Land Warfare Association of the United States Army, October 2012), 6.

[29] Ibid.

[30] Ibid., 5.

[31] Ibid., 11.

[32] Ibid., 4.

[33] GEN Raymond Odierno, "*Association of the United States Army Keynote Speech*," AUSA Institute of Land Warfare breakfast, Washington DC, January 23, 2013.

[34] Director, Operational Test and Evaluation, *FY2012 Annual Report*, (Washington DC: Department of Defense, December 2012), iii.

[35] Laura Pegher, email message to author, January 29, 2013.

[36] Ibid.